

REMARKS

The present Amendment replaces the Amendment filed on March 15, 2010 in its entirety and responds to both the Final Office Action dated December 15, 2009 and the Advisory Action of March 23, 2010.

This Amendment is being filed in connection with a Request for Continued Examination. Applicants have amended claims 1, 57, 58, 62 – 63 and 66 to clarify the claims, canceled claims 54, 55 and 61, and added new claims 72 – 74. No new matter has been added through the above amendments. Claims 2 – 36 and 65 were previously canceled. Accordingly, claims 1, 37 – 53, 56 – 60, 62 – 64 and 66 – 73 remain pending in this application. At least for the reasons set forth below, Applicants respectfully traverse the foregoing rejections.

In the Office Action dated December 15, 2009, the Examiner rejected claims 1 and 37 – 64 and 66 – 71 under 35 U.S.C. § 112, second paragraph. The Examiner also rejected claims 1, 41 – 44, 49 – 54, 56, 57, 59 – 62, 68, 70, and 71 under 35 U.S.C. § 102(b) as allegedly being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as allegedly being obvious over Berlinghof, Jr. (U.S. Patent No. 3,342,667) (hereinafter, “Berlinghof”); claims 1, 37, 38, 41 – 44, 49 – 54, 56, 57, 59 – 62, and 66 – 71 under 35 U.S.C. § 103(a) as allegedly being obvious over Berlinghof with or without the teaching of DE2917856 (hereinafter DE ‘856) or Okado et al. (U. S. Publication No. 2003/0134141) (hereinafter, “Okado”); claims 1, 40 – 44, 49 – 54, 56, 57, 59 – 63, 66, 68, 70, and 71 under 35 U.S.C. § 103(a) as allegedly being obvious over Berlinghof in view of Rey (U.S. Patent No. 4,497,764) (hereinafter, “Rey”); claims 1, 40 – 44, 49 – 54, 56, 57, 59 – 64, 66, 68, 70 and 71 under 35 U.S.C. § 103(a) as allegedly being obvious over Berlinghof in view of Rey and in further view of Tokunaga et al. (U.S. Patent No. 5,985,455) (hereinafter, “Tokunaga”); claims 1, 37, 38, 41 – 44, 49 – 54, 56 – 62 and 66 – 71 under 35 U.S.C. § 103(a) as allegedly being obvious over Berlinghof in view of Araki et al. (U.S. Patent No. 6,726,994) (hereinafter, “Araki”); and claims 1, 37 – 44, 49 – 54, 56 – 62, and 66 – 71 as allegedly being obvious over Berlinghof in view of Oohira et al. (U.S. Publication No. 2003/0022797 A1) (hereinafter, “Oohira”). Applicants respectfully traverse these rejections.

As Applicants’ remarks with respect to the Examiner’s rejections are sufficient to overcome these rejections, Applicants’ silence as to assertions by the Examiner in the Office Action or certain

requirements that may be applicable to such rejections (e.g., whether a reference constitutes prior art, motivation to combine references, assertions as to dependent claims, etc.) is not a concession by Applicants that such assertions are accurate or such requirements have been met, and Applicants reserve the right to analyze and dispute such assertions/requirements in the future. Further, for any instances in which the Examiner took Official Notice in the Office Action, Applicants expressly do not acquiesce to the taking of Official Notice, and respectfully request that the Examiner provide an affidavit to support the Official Notice taken in the next Office Action, as required by 37 CFR 1.104(d)(2) and MPEP § 2144.03. Applicants respectfully request reconsideration of the present application in view of the above amendment, new claims and the following remarks.

Claim Rejections – 35 U.S.C. § 112

Claims 1, 37-64 and 66-71 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Specifically, the Examiner alleged that claim 1 included claim language that was confusing and indefinite; that claims 54 and 55 were improper, confusing, indefinite and lacked antecedent basis; claims 57, 58, 61 and 62 were confusing, indefinite and lacked antecedent basis; and claims 65 and 66 were confusing and indefinite.

Applicants have amended claim 1 to clarify the claim, eliminating the allegedly confusing and indefinite language. Specifically, claim 1 has been amended to remove the term “optionally” and include the recitation of “the substrate having at least one of a sliding layer of a polymer-based bearing material thereon, and a layer of a metallic bearing material thereon with the sliding layer of a polymer-based bearing material on the metallic bearing material” and “wherein the polymer-based bearing material is adhered directly to at least one of the substrate and to the layer of the metallic bearing material by the adhesive properties of the matrix material.” Thus, the layer of the polymer-based bearing material may be adhered directly to the substrate or the polymer-based bearing material may be adhered to the metallic bearing material. Additionally, Applicants have amended claims 57, 58 and 62 for clarity and to provide proper antecedent relationship with claim 1. Claim 62 has been further amended to change the dependency to claim 1. Claim 66 has been amended to

remove the reference to the “optional layer” to coincide with the amendments made to independent claim 1. Thus, the claim now has proper antecedent basis to the “metallic bearing material.”

Claims 54, 55 and 61 have been canceled and claim 65 was previously canceled thereby rendering the Examiner’s pending rejection of these claims moot. Accordingly, the §112 rejections have been overcome.

Claim Rejections – 35 U.S.C. §§ 102 and 103

Claims 1, 41-44, 49-54, 56, 57, 59-62, 66, 68, 70 and 71 were rejected under 35 U.S.C. § 102(b) as anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Berlinghof, Jr. (U.S. Patent No. 3,342,667).

As noted above, claims 54 and 61 have been canceled from the subject application, so the rejection of claims 54 and 61 is moot.

To anticipate a claim, the reference must teach every element of the claim. “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). “The identical invention must be shown in as complete detail as is contained in the ... claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Independent claim 1, as amended, is directed to a plain bearing comprising: “a strong backing material substrate, the substrate having at least one of a sliding layer of a polymer-based bearing material thereon, and a layer of a metallic bearing material thereon with the sliding layer of a polymer-based bearing material on the metallic bearing material, the polymer-based bearing material comprising a polymer-based matrix selected from the group consisting of a modified epoxy resin and a polyimide/amide resin, the matrix resin having contained therein particles of a metal powder in the range from 15 to 30 vol% and particles of a fluoropolymer content lying in the range from approximately 2 to 8 vol%, and selectively including an addition selected from the group consisting of a ceramic powder in the range from 0.5 to 20 vol%, and, silica in the range from 2 to 15 vol%, wherein a total solids content of the polymer-based bearing material does not exceed 35 vol%, and wherein the polymer-based bearing material is adhered directly to at least one of the

substrate and to the layer of the metallic bearing material by the adhesive properties of the matrix material.”

The Examiner alleged that Berlinghof discloses all of the elements of independent claim 1. Specifically, the Examiner alleged that Berlinghof discloses a bearing material utilizing a phenol-modified epoxy resin and a mixture of metal powders, fluoropolymer particles and solid lubricant in overlapping ranges, which anticipates Applicants’ claim 1. However, Berlinghof fails to disclose a plain bearing having “at least one of a sliding layer of a polymer-based bearing material thereon, and a layer of a metallic bearing material thereon with the sliding layer of a polymer-based bearing material on the metallic bearing material,” the polymer-based matrix selected from the group consisting of a modified epoxy resin and a polyimide/amide resin, the matrix resin having contained therein particles of a metal powder in the range from 15 to 30 vol% and particles of a fluoropolymer content lying in the range from approximately 2 to 8 vol%,” within the context of independent claim 1, as amended. Additionally, Berlinghof fails to disclose that the “total solids content of the polymer-based bearing material does not exceed 35 vol%” and that “the polymer-based bearing material is adhered directly to at least one of the substrate and to the layer of the metallic bearing material by the adhesive properties of the matrix material,” within the context of independent claim 1, as amended.

Berlinghof is directed to a polymer-based bearing material comprising a thermosetting resin matrix containing 18 – 52 vol% metal particles, and around 14 to 32 vol% fluorocarbon, together with 12 to 32 vol% solid lubricants. (*See* Col. 3, lines 49 – 66). Thus, Berlinghof’s 14 to 32 vol% fluorocarbon is clearly outside of the range of 2 – 8 vol%, as recited in Applicants’ amended independent claim 1. Additionally, Berlinghof discloses that the solid components of the bearing material are thoroughly mixed and molded with a cold-press. (*See* Col. 4, lines 5 – 23). Further, the material may also be molded against clean metal substrate. (*See* Col. 4, lines 24 – 25). The material-binding resin forms a strong bond with the substrate, making possible the use of thin-walled strong bearing assemblies. (*See* Col. 4, lines 24 – 30). Thus, Berlinghof’s teaches at most bonding to the substrate and fails to teach or suggest that the polymer-based bearing material is adhered directly to at least one of the substrate and to the layer of the metallic bearing material by the adhesive properties of the matrix material. Moreover, Berlinghof discloses an addition of solids

content to be around at least 44 vol%, based on a minimum metal content of 18%, a minimum solid lubricant content of 12% and a minimum fluorocarbon content of 14%. (*See* Col. 3, lines 49 – 66). Thus, the lowest solids content is 44% of the final bearing volume, which is substantially higher than the 35 vol% solids content as required by Applicants' independent claim 1, as amended.

Accordingly, Berlinghof fails to disclose a plain bearing having at least one of a sliding layer of a polymer-based bearing material thereon, and a layer of a metallic bearing material thereon with the sliding layer of a polymer-based bearing material on the metallic bearing material, wherein the polymer-based bearing material includes particles of fluoropolymer in the range from 2 – 8 vol% as claimed by Applicants. Additionally, Berlinghof fails to disclose that total solids content of the polymer-based bearing material does not exceed 35 vol% and that the polymer-based bearing material is adhered directly to at least one of the substrate and to the layer of the metallic bearing material by the adhesive properties of the matrix material as also claimed by Applicants. As Berlinghof fails to disclose each and every element of independent claim 1 of the subject application, independent claim 1 and dependent claims 41 – 44, 49 – 53, 56, 57, 59, 60, 62, 66, 68, 70 and 71 are patentable over Berlinghof for at least this reason. Moreover, dependent claims 41 – 44, 49 – 53, 56, 57, 59, 60, 62, 66, 68, 70 and 71 each contain additional recitations that are separately patentable as well.

In the Office Action, the Examiner indicated that independent claim 1 and dependent claims 41 – 44, 49 – 54, 56, 57, 59 – 62, 66, 68, 70 and 71 were obvious over Berlinghof. However, the Examiner failed to include a discussion or support for this rejection within the Office Action. (*See* Office Action, pages 3 – 4). Therefore, Applicants respectfully request the Examiner withdraw the rejection.

Claim Rejections – 35 U.S.C. § 103

I. Berlinghof with or without DE '856 or Okado

Claims 1, 37, 38, 41 – 44, 49 – 54, 56, 57, 59 – 62 and 66 – 71 were rejected under 35 U.S.C. § 103(a) as obvious over Berlinghof with or without teaching of DE '856 or Okado.

As noted above, claims 54 and 61 have been canceled from the subject application, so the rejection of claims 54 and 61 is moot.

As noted above in the section 102 response, Berlinghof fails to disclose a plain bearing having at least one of a sliding layer of a polymer-based bearing material thereon, and a layer of a metallic bearing material thereon with the sliding layer of a polymer-based bearing material on the metallic bearing material, wherein the polymer-based bearing material includes particles of fluoropolymer in the range from 2 – 8 vol% as claimed by Applicants. Additionally, Berlinghof fails to disclose that the total solids content of the polymer-based bearing material does not exceed 35 vol% and that the polymer-based bearing material is adhered directly to at least one of the substrate and to the layer of the metallic bearing material by the adhesive properties of the matrix material as also claimed by Applicants.

a. Berlinghof with DE ‘856

The English abstract of the DE ‘856 patent states that the “hydraulically-lubricated plain bearing is of bearing metal with a non-metallic coating to reduce starting friction.” (See Lines 1-3 of the English abstract) (Emphasis added). Thus, the DE ‘856 patent clearly discloses that the coating does not include any metal. Therefore, the DE ‘856 clearly fails to disclose that the “matrix resin having contained therein particles of a metal powder in the range from 15 to 30 vol% and particles of a fluoropolymer content lying in the range from approximately 2 to 8 vol%,” as claimed by Applicants.

Further, as the DE ‘856 patent specifically states that the coating is a non-metallic coating, the ‘856 patent teaches away from the coating including any metals. Thus, it would not be obvious to combine the metallic coating of Berlinghof with DE ‘856, which clearly teaches a non-metallic coating.

Accordingly, independent claim 1, and dependent claims 37, 38, 41 – 44, 49 – 53, 56, 57, 59, 60, 62 and 66 – 71, are patentable over the Berlinghof and ‘856 patent, as the ‘856 patent fails to disclose, and in fact teaches away from, the coating including “particles of a metal powder in the range from 15 to 30 vol%” as claimed by Applicants. Moreover, dependent claims 37, 38, 41 – 44, 49 – 53, 56, 57, 59, 60, 62 and 66 – 71 each contain additional recitations that are separately patentable as well.

b. Berlinghof with Okado

Okado is directed to a crosshead bearing for a marine engine, comprising a bearing alloy layer and a synthetic resin coating layer bonded thereto. (*See Abstract*). Additionally, the synthetic resin coating, as disclosed by Okado, includes the addition of a solid lubricant at a minimum of 5 vol%, hard particles at not more than 5 vol% and metal powder at not more than 10 vol% to the synthetic resin at a minimum of 30 vol%; thus the minimum total solids content must exceed 35 vol% or more. (*See paragraphs [0021] – [0025]*). Thus, Okado cannot require that the total solids content of the synthetic resin coating layer is a maximum of 35 vol% because Okado clearly teaches that the minimum total solids content is above 35 vol%. Therefore, the Berlinghof and Okado, taken alone or in combination fails to render Applicants' claim 1 obvious, because Berlinghof and Okado fail to disclose that the total solids content of the polymer-based bearing material does not exceed 35 vol%.

Accordingly, independent claim 1, and dependent claims 37, 38, 41 – 44, 49 – 53, 56, 57, 59, 60, 62 and 66 – 71, are patentable over the Berlinghof and Okado patents, as the combination fails to disclose, and in fact teaches away from, the coating including “particles of a metal powder in the range from 15 to 30 vol%” as claimed by Applicants. Moreover, dependent claims 37, 38, 41 – 44, 49 – 53, 56, 57, 59, 60, 62 and 66 – 71 each contain additional recitations that are separately patentable as well.

II. Berlinghof in view of Rey

Claims 1, 40 – 44, 49 – 54, 56, 57, 59 – 63, 66, 68, 70 and 71 were rejected under 35 U.S.C. § 103(a) as obvious over Berlinghof in view of Rey.

As noted above, claims 54 and 61 have been canceled from the subject application, so the rejection of claims 54 and 61 is moot.

As noted above, Berlinghof fails to disclose that the total solids content of the polymer-based bearing material does not exceed 35 vol% and that the polymer-based bearing material is adhered directly to at least one of the substrate and to the layer of the metallic bearing material by the adhesive properties of the matrix material as claimed by Applicants.

Rey is directed to an epoxy resin grout having improved resistance to creep deformation while retaining its resistance to adverse chemical and/or elevated temperature environments while retaining resistance to abrasion. (*See* Abstract and col. 2, lines 17 – 21). However, Rey fails to disclose that the epoxy resin grout has a maximum total solids content of the polymer-based bearing material not to exceed 35 vol% and that the polymer-based bearing material is adhered directly to at least one of the substrate and to the layer of the metallic bearing material by the adhesive properties of the matrix material as claimed by Applicants. Therefore, Berlinghof and Rey, taken alone or in combination both fail to disclose each and every element of independent claim 1.

Accordingly, independent claim 1, and dependent claims 40 – 44, 49 – 53, 56, 57, 59, 60, 62, 63, 66, 68, 70 and 71 are patentable over the cited references for at least the above reasons. Moreover, dependent claims 40 – 44, 49 – 53, 56, 57, 59, 60, 62, 63, 66, 68, 70 and 71 each contain additional recitations that are separately patentable as well.

III. Berlinghof in view of Rey and further in view of Tokunaga

Claims 1, 40 – 44, 49 – 54, 56, 57, 59 – 64, 66, 68, 70 and 71 were rejected under 35 U.S.C. § 103(a) as obvious over Berlinghof in view of Rey and further in view of Tokunaga.

As noted above, claims 54 and 61 have been canceled from the subject application, so the rejection of claims 54 and 61 is moot.

As noted above in the section 102 and 103 responses, both Berlinghof and Rey, taken alone or in combination fail to disclose that the total solids content of the polymer-based bearing material does not exceed 35 vol% and that the polymer-based bearing material is adhered directly to at least one of the substrate and to the layer of the metallic bearing material by the adhesive properties of the matrix material as claimed by Applicants.

Tokunaga is directed to a semiconductor element sealed with an epoxy resin compound. The semiconductor element of Tokunaga is sealed with the epoxy resin to provide improved reliability at high temperature and humidity and good resistance to soldering heat. (*See* Col. 1, lines 14-22). However, Tokunaga fails to disclose that the epoxy resin has a maximum total solids content of the polymer-based bearing material not to exceed 35 vol% and that the polymer-based bearing material is adhered directly to at least one of the substrate and to the layer of the metallic bearing material by

the adhesive properties of the matrix material as claimed by Applicants. Therefore, Berlinghof, Rey and Tokunaga, taken alone or in combination all fail to disclose each and every element of independent claim 1.

Accordingly, independent claim 1, and dependent claims 40 – 44, 49 – 53, 56, 57, 59, 60, 62 – 64, 66, 68, 70 and 71 are patentable over the cited references for at least the above reasons. Moreover, dependent claims 40 – 44, 49 – 53, 56, 57, 59, 60, 62 – 64, 66, 68, 70 and 71 each contain additional recitations that are separately patentable as well.

IV. Berlinghof in view of Araki

Claims 1, 37, 38, 41 – 44, 49 – 54, 56 – 62 and 66 – 71 were rejected under 35 U.S.C. § 103(a) as obvious over Berlinghof in view of Araki.

As noted above, claims 54 and 61 have been canceled from the subject application, so the rejection of claims 54 and 61 is moot.

As discussed above, Berlinghof fails to disclose that the total solids content of the polymer-based bearing material does not exceed 35 vol% as claimed by Applicants.

Araki is directed to a structural member comprising a fluorine-containing polymer and a substrate adhered to each other, and the structural member having improved adhesive strength at high temperature and the sliding material is produced by using the structural member. (*See* Abstract). However, Araki fails to disclose that the fluorine-containing polymer has a maximum total solids content of the polymer-based bearing material not to exceed 35 vol% as claimed by Applicants. Therefore, Berlinghof and Araki, taken alone or in combination both fail to disclose each and every element of independent claim 1.

Accordingly, independent claim 1, and dependent claims 37, 38, 41 – 44, 49 – 53, 56 – 60, 62 and 66 – 71 are patentable over the cited references for at least the above reasons. Moreover, dependent claims 37, 38, 41 – 44, 49 – 53, 56 – 60, 62 and 66 – 71 each contain additional recitations that are separately patentable as well.

V. Berlinghof in view of Oohira

Claims 1, 37 – 44, 49 – 54, 56 – 62 and 66 – 71 were rejected under 35 U.S.C. § 103(a) as obvious over Berlinghof in view of Oohira.

As noted above, claims 54 and 61 have been canceled from the subject application, so the rejection of claims 54 and 61 is moot.

As discussed above, Berlinghof fails to disclose that the particles of a fluoropolymer content lie in the range from approximately 2 to 8 vol%, as claimed by Applicants. Oohira discloses a composition composed by adding a porous silica and a lubricant to a base material, by adding lubricant-impregnated porous silica to the base material, or by adding lubricant impregnated porous silica and lubricant to the base material. (*See* Abstract). Oohira further discloses the use of a fluoropolymer as an additive to the base material for improving a sliding property. (*See* Col. 10, lines 35 – 38). Oohira discloses that the fluoropolymer was only used in examples 14, 11, 21 and 32 – 34 and in these examples the amount of fluoropolymer used was between 10 and 35 vol%. (*See* Tables 1 – 8). Thus, Oohira's teachings of adding between 10 and 35 vol% is considerably higher than the 2 to 8 vol% as required by Applicants' independent claim 1. As Oohira discloses a fluoropolymer additive range between 10 and 35 vol%, Oohira clearly fails to disclose a fluoropolymer content lies in the range from approximately 2 to 8 vol% as claimed by Applicants. Therefore, Berlinghof and Oohira, taken alone or in combination both fail to disclose each and every element of independent claim 1.

Accordingly, independent claim 1, and dependent claims 37 – 44, 49 – 53, 56 – 60, 62 and 66 – 71 are patentable over the cited references for at least the above reasons. Moreover, dependent claims 37 – 44, 49 – 53, 56 – 60, 62 and 66 – 71 each contain additional recitations that are separately patentable as well.

NEW CLAIMS

New independent claims 72 – 75 have been added in this Amendment for the Examiner's consideration. Support for the new claims 72 – 75 may be found at least in paragraphs [0030] and [0040] of the Application as originally filed. The cited references, whether taken singularly or in any permissible combination, do not anticipate, teach or suggest the subject matter recited in new claims 72 – 75. The Examiner's consideration of new claims 72 – 75 is respectfully requested.

Conclusion

In view of the above amendment and remarks, the pending application is in condition for allowance. If, however, there are any outstanding issues that can be resolved by telephone conference, the Examiner is earnestly encouraged to telephone the undersigned representative.

It is believed that any fees associated with the filing of this paper are identified in an accompanying transmittal. However, if any additional fees are required, they may be charged to Deposit Account No. 18-0013, under Order No. 66775-0009. To the extent necessary, a petition for extension of time under 37 C.F.R. § 1.136 is hereby made, the fee for which should be charged against the aforementioned account.

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Respectfully submitted,

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